Canadian Aviation Safety Board

Bureau canadien de la sécurité aérienne

Civil Aviation Occurrence Report

Canada

The Canadian Aviation Safety Board investigated this occurrence for the purpose of advancing aviation safety. It is not the object of the Board to determine or apportion any blame or liability.

AVIATION OCCURRENCE REPORT

AEROFLOT
ILYUSHIN IL 86 86075
GANDER, NEWFOUNDLAND
19 MARCH 1987

REPORT NUMBER 87-A74916

SYNOPSIS

The aircraft was landing in Gander, Newfoundland after a scheduled flight from Havana, Cuba. As the captain initiated the flare, the aircraft entered an area of reduced visibility in fog. The aircraft touched down, moved to the left, and tracked along the edge of the runway for 1,082 feet (330 metres) before returning to the centre line. The landing gear broke four runway lights and four taxiway lights, and a cowling was torn off the number one engine pod when it struck a snowbank 42 feet (13 metres) to the left of the runway edge.

The Canadian Aviation Safety Board (CASB) determined that, while attempting to land from an unstabilized approach, the pilot brought the aircraft below the altitude prescribed by the standards of the USSR Civil Aviation Ministry for the performance of the missed approach manoeuvre. The pilot was unable to maintain the aircraft on the runway centre line because of the lack of adequate visual references when dense fog was encountered during the landing flare. Contact with a snowbank that was parallel to the runway and that was higher than specified by Transport Canada guidelines contributed to the aircraft damage.

Ce rapport est également disponible en français.

13 September 1988

TABLE OF CONTENTS

		Page
1.0	**FACTUAL INFORMATION**	**1**
1.1	History of the Flight	1
1.2	Injuries to Persons	2
1.3	Damage to Aircraft	2
1.4	Other Damage	2
1.5	Personnel Information	3
1.6	Aircraft Information	3
1.7	Meteorological Information	3
1.7.1	Forecast Weather	3
1.7.2	Actual Weather	4
1.7.3	Weather Reported to Crew by Air Traffic Control	5
1.8	Aids to Navigation	5
1.9	Communications	5
1.10	Aerodrome Information	5
1.10.1	General	5
1.10.2	Runway 04	6
1.10.3	Runway Inspections	6
1.11	Flight Recorders	6
1.11.1	FDR Data Recovery	7
1.11.2	Analysis of Recovered Data	7
1.12	Wreckage and Impact Information	7
1.13	Medical Information	8
1.14	Fire	8
1.15	Survival Aspects	8
1.16	Tests and Research	8
1.17	Additional Information	8
1.17.1	IL 86 Aircraft Dimensions	8
1.17.2	Snow-Clearance Criteria	9
1.17.3	Wing Overhang - Runway	9
1.17.4	Aeroflot Instrument Approach Procedure	10
1.17.5	IL 86 Aircraft Go-Around Capability	10
1.17.6	IL 86 Coupled ILS/Autopilot Approach	10
2.0	**ANALYSIS**	**11**
2.1	Introduction	11
2.2	FDR Information	11
2.3	Weather	11
2.4	Visual Effects on Landing	12
2.5	Flare and Landing	12
2.6	Snow Clearing	12
2.7	Decision To Land	12

TABLE OF CONTENTS

3.0	**CONCLUSIONS**	**13**
3.1	Findings	13
3.2	Causes	14
4.0	**SAFETY ACTION**	**15**
4.1.2	Snow-Removal Guidelines	15
5.0	**APPENDICES**	

APPENDIX A - PLAN/ELEVATION - INCIDENT AREA
APPENDIX B - SNOW CLEARANCE COMPARED WITH TRANSPORT CANADA AND ICAO GUIDELINES
APPENDIX C - GLOSSARY

1.0 FACTUAL INFORMATION

1.1 History of the Flight

On 19 March 1987, Aeroflot Flight 346, an Ilyushin (IL)* 86, 86075, departed Havana, Cuba on a scheduled flight to Moscow, U.S.S.R. with a planned technical stop at Gander, Newfoundland, Canada. On board were 12 crew members and 190 passengers.

Approaching Gander, terminal radar control vectored the aircraft for a straight-in instrument landing system (ILS) approach to the runway in use, runway 04, in instrument meteorological conditions (IMC). The co-pilot, in the right seat, was manually flying the approach when the aircraft intercepted the ILS localizer and glide path. The aircraft, although initially high on the glide path, remained established with drift eliminated on the localizer. At 328 feet (100 metres) above ground level (agl), the rate of descent increased, and the aircraft descended below the glide path and deviated left of the localizer. The captain, in the left seat, took control at decision height (DH), 200 feet (60 metres)** agl, continued the approach and completed the landing by visual reference to the runway. The aircraft was still low on the glide path and to the left of the localizer, and the captain was correcting to the right as the aircraft crossed the threshold, 33 feet (10 metres) agl. During the flare and landing, the visibility was reduced by fog, and the captain continued the landing using the radio altimeter for altitude reference. The aircraft touched down in a left-wing-low attitude, 36 feet (11 metres) to the right of the centre line while the captain was correcting back to the left. The aircraft continued to move toward the left side of the runway.

During the landing roll, the left main landing gear damaged several runway edge and taxiway lights on the left side of the runway, and the number one engine pod dragged through the hard-packed snowbank. The application of right rudder during the landing roll started the aircraft back towards the centre line, and, when the nose gear was lowered to the ground, positive steering enabled the captain to return the aircraft to the centre line (see Appendix A).

* See Glossary for all abbreviations and acronyms.
** Units are consistent with official manuals, documents, reports, and instructions used by or issued to the crew.

The crew, unaware that the engine had struck the snow or that lights had been damaged, taxied to the gate and shut down the engines. Aeroflot maintenance personnel were commencing their normal duties when they were advised that some aircraft components had been found on the runway, and they were asked to check the aircraft. The maintenance check revealed that a portion of an engine cowling and associated hardware were missing.

A further check of the landing runway by the field foreman confirmed that an engine had struck the snow and dislodged a section of cowling and that four runway edge lights and four taxiway lights had been damaged.

The incident occurred at 0800 Coordinated Universal Time (UTC)* during the hours of darkness, at lat 48°56'N, long 54°34'W at an elevation of 496 feet above sea level (asl).

1.2 Injuries to Persons

	Crew	Passengers	Others	Total
Fatal	-	-	-	-
Serious	-	-	-	-
Minor/None	12	190	-	202
Total	12	190	-	202

1.3 Damage to Aircraft

The aircraft sustained damage to the aft end of the number one engine cowling. A four-by-four-foot section of the cowling and associated hardware were torn free of the engine. There was no evidence of engine damage caused by snow ingestion.

1.4 Other Damage

Four runway edge lights located along the left-hand edge of the runway at the intersection of taxiway Foxtrot and four taxiway lights on taxiway Foxtrot at the intersection of runway 04 were broken.

* All times are UTC unless otherwise stated.

1.5 Personnel Information

	Captain	First Officer
Age	48	41
Pilot Licence	Airline Transport (U.S.S.R.)	Airline Transport (U.S.S.R.)
Medical Expiry Date	Valid	Valid
Total Flying Time	11,000 hr	10,000 hr
Total on Type	2,200 hr	850 hr
Total Last 90 Days	110 hr	75 hr
Total on Type Last 90 Days	110 hr	75 hr
Hours on Duty Prior to Occurrence	8 hr	8 hr
Hours off Duty Prior to Work Period	16 hr	16 hr

1.6 Aircraft Information

Manufacturer	Ilyushin
Type	IL 86
Year of Manufacture	1982
Serial Number	86075
Certificate of Airworthiness	Not Available
Total Airframe Time	Not Available
Engine Type (4)	Kuznetsov NK-86
Maximum Allowable Take-off Weight	208,000 kg
Recommended Fuel Type	JET A-1

The aircraft weight and centre of gravity were within the prescribed limits.

1.7 Meteorological Information

1.7.1 Forecast Weather

A terminal forecast issued at 0430Z on 19 March 1987 for Gander for the period 0500Z 19 March to 0500Z 20 March was as follows:

Ceiling 100 feet obscured, 1/4 mile in light drizzle and fog, wind 100 degrees true at 10 knots, occasional ceiling 400 feet overcast, one mile in light rain showers and fog.

The forecast, as issued in ICAO format, was as follows:

Wind 100 degrees true at 10 knots, 400 metres in drizzle and fog, sky obscure ceiling 100 feet, temporarily 1 600 metres in rain showers and mist, cloud 8/8 stratus at 400 feet.

A terminal forecast issued on 18 March 1987 for Gander for the period 2300Z 18 March to 2300Z 19 March was as follows:

Ceiling 100 feet obscured, 1/8 mile in light drizzle and fog, wind 100 degrees true at 10 knots, occasional ceiling 400 feet overcast, 3/4 mile in light rain showers and fog.

The forecast, as issued in ICAO format, was as follows:

Wind 100 degrees true at 10 knots, visibility 200 metres in drizzle and fog, sky obscured ceiling 100 feet, temporarily visibility 1 200 metres in rain showers and fog, cloud 8/8 stratus at 400 feet.

1.7.2 **Actual Weather**

0647/19 March - Special - Indefinite ceiling 200 feet obscured, 1/8 mile visibility in light rain showers and fog, wind from 100 degrees true at six knots, obscuring phenomena fog.

0700/19 March - Indefinite ceiling 200 feet obscured, 1/8 mile visibility in light rain showers and fog, temperature 1.5 degrees Celsius, dew point 1.3 degrees Celsius, wind 090 degrees at six knots, obscuring phenomena fog.

0709/19 March - Special - Indefinite ceiling 300 feet obscured, 1/4 mile visibility in light rain showers and fog, wind 100 degrees at five knots, obscuring phenomena fog.

0725/19 March - Special - Indefinite ceiling 300 feet obscured, 1/2 mile visibility in light rain showers and fog, wind calm, obscuring phenomena fog.

0744/19 March - Special - Indefinite ceiling 200 feet obscured, 1/4 mile visibility variable 1/8 to 1/2 mile in light rain showers and fog, wind 120 degrees at seven knots, obscuring phenomena fog.

0800/19 March - Indefinite ceiling 200 feet obscured, 1/4 mile visibility variable 1/8 to 1/2 mile in light rain showers and fog, temperature 1.9 degrees Celsius, dew point 1.5 degrees Celsius, wind 130 degrees at nine knots, obscuring phenomena fog.

1.7.3 Weather Reported to Crew by Air Traffic Control

0748Z - Indefinite, 200 obscured, 1/4 of a mile variable in light rain showers and fog, temperature two, dew point is minus two, and the visibility is variable from 1/8 of a mile to 1/2 a mile, the surface wind is presently 140 degrees magnetic at eight knots, altimeter 29.96, and the RVR setting for runway 04 at light setting number three is 2,600 feet.

0756Z - ... Runway 04, winds 150 ten knots, altimeter is 29.97, prevailing visibility 1/4 mile, light setting four, visual range runway 04 is 3,000 feet, number one ...

0759Z - ... the winds 150 at eight knots, prevailing visibility 1/4 of a mile, visual range light setting four is 2,600 feet...

1.8 Aids to Navigation

The aircraft was conducting an ILS approach to runway 04 at Gander. The ILS localizer and glide slope were reported to be functioning normally, and a flight check conducted by Transport Canada after the incident confirmed that the ILS was serviceable. The glide slope is set at three degrees, the threshold crossing altitude is 57 feet (17 metres) agl, and the touchdown point is 1,100 feet (335 metres) beyond the threshold.

The ILS approach limits for runway 04 are DH 200 feet (60 metres) agl, visibility one-half mile, and RVR 2,600 feet (800 metres).

1.9 Communications

Aeroflot Flight 346, under control of Gander Terminal, descended to 3,700 feet and was vectored by radar for a straight-in ILS approach to runway 04. At 0755, control was handed over to Gander Tower on 118.1 megahertz (MHz). All communications were reported to be normal.

1.10 Aerodrome Information

1.10.1 General

Gander International Airport is at a reference altitude of 496 feet asl. Runway 04/22 is 10,500-by-200 feet and is one of two operational runways. Runway 04, the main runway, was active although the wind favoured runway 13.

1.10.2 Runway 04

Runway 04 is an approved instrument runway with Category I, centre-row high-intensity approach lighting and standard runway edge and threshold lighting. The runway is equipped with RVR measuring equipment in the touchdown area. Notice to Airmen (NOTAM) 114 was issued prior to the incident indicating that one-third of the high-intensity approach lights were unserviceable. An inspection following the incident revealed that about two-thirds of the lights were unserviceable.

The pilot-in-command and the navigator saw the approach lights at DH (200 feet/60 metres agl).

At the time of the occurrence, the airport was covered with snow. The runway was 100 per cent bare and wet, and the snow had been cleared back 25 feet (7.6 metres) from the edge of the runway.

Snow, blown from the runway by snow-removal equipment, had piled up beyond the cleared area and was hard packed. The height of the snowbank where the engine made contact was up to 4.5 feet (1.37 metres).

The terrain under the approach path and to the sides of the runway beyond the cleared area was snow covered and void of any remarkable features.

1.10.3 Runway Inspections

Asphalt surfaces at Gander are susceptible to deterioration because wheels of large aircraft track near the edges of the taxiways and because it is difficult to stabilize runway shoulders in severe weather conditions. Because of potential foreign object damage resulting from asphalt debris, Gander has established a policy of inspecting runways for debris after arrivals or departures of wide-body aircraft, in particular, the Boeing 747 and IL 86 aircraft. A runway inspection was carried out by the field foreman after Flight 346 landed.

1.11 Flight Recorders

The aircraft was equipped with a MSRP-256 flight data recorder (FDR) system and a MARS-BM cockpit voice recorder (CVR).

1.11.1 FDR Data Recovery

The FDR and CVR were analysed by CASB investigators at the Aeroflot Playback Facility at Sheremetyevo Airport, Moscow, in cooperation with Aeroflot and the U.S.S.R. State Science and Research Institute for Civil Aviation. A segment of the final approach from the outer marker to the landing and roll-out was examined in detail.

1.11.2 Analysis of Recovered Data

The data indicated that, on the approach inbound from the outer marker, the aircraft was slightly above the glide path and was oscillating about the extended runway centre line of 036 degrees. The aircraft average magnetic heading was eight degrees greater than that of the runway, implying a cross-wind component from the right.

Twenty-four seconds prior to touchdown, when the aircraft was 328 feet (100 metres) agl, the rate of descent increased, and the aircraft went a maximum of 25 feet (7.6 metres) below the glide path. The aircraft moved up to 40 feet (12 metres) left of the centre line and, with the application of seven to eight degrees of bank, was corrected back to the right; the aircraft crossed the threshold at an altitude of 33 feet (10 metres) agl. The drift angle was reduced by the application of 14 degrees of left rudder, and the aircraft touched down 36 feet (11 metres) to the right of the centre line, in a left-wing-down attitude. Although aligned with the runway, the aircraft continued to move to the left for three seconds, at which time the application of right rudder increased the aircraft heading, and the aircraft started to return toward the centre line. The left main landing gear tracked along the left edge of the runway for 1,080 feet (330 metres), before the aircraft was returned to the centre line.

1.12 Wreckage and Impact Information

The crew of Aeroflot Flight 346 did not realize that they had struck the snowbank, so they did not make any report to air traffic services; however, during the required runway inspection, the field foreman discovered debris consisting of broken glass and pieces of asphalt in the vicinity of taxiway Foxtrot. The foreman advised the Airport Duty Manager and Aeroflot; Aeroflot requested a further runway inspection. A check revealed several aircraft-related components (small pieces of aluminum metal and a three-foot metal actuating rod) on, and along, the left side of the runway in the snow, where the number one engine pod had struck and dragged through the

snow. The left main landing gear had tracked along the edge of the runway for 1,080 feet (330 metres), between 4,020 and 5,100 feet (1 225 and 1 555 metres) from the threshold, and had damaged four runway edge lights and four taxiway lights. Both the left and right main landing gear were on the runway and the wings were level when the number one engine struck the snowbank.

1.13 Medical Information

- Nil -

1.14 Fire

There was no evidence found of fire either before or after the occurrence.

1.15 Survival Aspects

Touchdown forces were within the normal forces experienced on landing.

1.16 Tests and Research

Not applicable.

1.17 Additional Information

1.17.1 IL 86 Aircraft Dimensions

The IL 86 has a wingspan of 157 feet (48 metres). The left and right main landing gear are located 16 feet (5 metres), to either side of a centre line main gear. The numbers one and four engines are 57 feet (17.4 metres) from the centre line of the aircraft, while the numbers two and three engines are 33 feet (10.2 metres) from the centre line. The outboard engines had a ground clearance of 4 feet (1.2 metres), and the inboard engines had a ground clearance of 3 feet (.95 metres) when measured after the incident with the aircraft parked on level ground.

1.17.2 Snow-Clearance Criteria

Transport Canada Manual of Snow Removal and Ice Control outlines a priority system regarding snow removal at airports. Priority I areas include one runway depending on prevailing wind direction, one taxiway, and the terminal area. Priority II areas include another runway and associated taxiway. Priority III areas include all shoulder areas, pre-threshold areas, glide path sites, and any remaining runways, taxiways, or parking areas. Priority I and II areas are normally cleared throughout a storm while Priority III areas are cleared last, in accordance with available manpower and equipment.

The Manual of Snow Removal provides guidelines for snow-removal procedures and indicates desired clearance distances and snow depths.

During Priority III snow-clearing operations, the snow beyond the runway edge lights is to be removed to a distance of at least 25 feet (7.6 metres) on both sides of all runways and taxiways to ensure that the lights remain uncovered if snow-drifting occurs. Vertical snow slopes are to be avoided along the edges of the runway, taxiways, aprons, and at the ends of the runways. Vertical edges must be rolled or levelled to form a smooth slope, as flat as possible, from the cleared areas to the snow-disposal area. In accordance with Appendix C of the manual, the maximum allowable snow depth 50 feet (15 metres) from the edge of the runway is 2.5 feet (1.3 metres). By ICAO recommended practices, the snow depth near the runway edge can be one foot (0.3 metres) increasing linearly to three feet (0.9 metres) 50 feet (15 metres) from the runway edge then to five feet (1.5 metres) at 66 feet (20 metres) from the edge. (See Appendix B.)

Although the required 25-foot (7.6 metres) area on both sides of runway 04 had been cleared, Priority III area clearing had not been completed because of the heavy snow accumulation in the days prior to the incident, which had kept snow-removal crews busy with Priority I and II areas.

1.17.3 Wing Overhang - Runway

During the excursion along the edge of the runway, the left wing of the aircraft was extended up to 62 feet (19 metres) beyond the runway edge. The number one engine was 42 feet (13 metres) past the runway edge and dragged through the snow intermittently for 460 feet (140 metres). The aircraft was in a nose-up attitude when the engine pod contacted the snow, and damage was limited to the aft section of the pod; there was no

internal engine damage. The marks in the snow were up to 1.5 feet (0.5 metres) deep and were 17 feet (5 metres) beyond the cleared area beside the runway.

1.17.4 Aeroflot Instrument Approach Procedure

Aeroflot uses a pilot-monitored approach while flying instrument approaches. The co-pilot flies the approach to DH. If the captain, or pilot in the left seat, has the runway environment in sight at DH, he takes over control and lands visually. If he has not made visual contact, he gives the co-pilot the command to go around.

1.17.5 IL 86 Aircraft Go-Around Capability

The IL 86 is capable of a go-around from below DH. It is normal Aeroflot practice to not conduct go-arounds from below 50 feet (15 metres); however, the aircraft is capable of a go-around from any altitude, and touch-and-go landings are conducted during crew training.

1.17.6 IL 86 Coupled ILS/Autopilot Approach

The IL 86 is equipped for and capable of performing a coupled ILS/autopilot approach. The aircraft was hand-flown by preference of the crew involved. The aircraft ILS equipment and autopilot were reported to be functioning normally.

2.0 ANALYSIS

2.1 Introduction

Following the occurrence, the crew stated that they were not aware that the number one engine had contacted the snow or that runway edge lights had been damaged. However, the tire tracks at the edge of the runway, the marks in the snow, and the data from the FDR confirmed that the aircraft had left the runway centre line.

The analysis focuses on the reasons why the aircraft tracked along the left side of the runway during the landing roll.

2.2 FDR Information

The FDR information indicated that the hand-flown ILS approach was not completely stabilized. At DH, when the captain took control, the aircraft was below the glide path and to the left of the extended centre line of runway 04. Just prior to touchdown, the captain banked the aircraft quite rapidly to the right and then back to the left, in an attempt to regain the centre line of the runway. The left-wing-down attitude on touchdown was the result of the inputs by the captain while he was flaring the aircraft and eliminating drift.

2.3 Weather

The weather at the time of Flight 346's arrival was variable. The ceiling remained at indefinite 200 feet obscured; however, the visibility was variable from one-eighth to one-half mile in rain showers and fog. Five minutes prior to landing, the RVR was 3,000 feet (914 metres) and had decreased to 2,600 feet (792 metres) when the aircraft was cleared to land. Because of the movement of the fog over the ground, the visibility over the landing area, just at the time of the flare, could have been less than that recorded by the RVR equipment. The wind, which was from 150 degrees magnetic at eight knots, was a cross-wind with a slight tail component and did require a drift correction during the approach.

The conditions as reported to and observed by the crew indicated that the approach and landing could be conducted safely. This conclusion is supported by the crew's report that the approach lights were in sight at DH. In spite of the conditions at DH, as the aircraft

was flared for landing, the visibility rapidly decreased when the aircraft entered an area of thicker fog. The captain did not attempt a go-around because he considered that the conditions at DH would allow a safe landing.

2.4 Visual Effects on Landing

The poor visibility because of the rain and fog, the dark, wet runway, the featureless snow-covered terrain on approach and off the sides of the runway, and the effects of the landing lights shining through the rain and fog all contributed to the crew's inability to adequately see the landing area and maintain the aircraft on the runway centre line. The reduced number of high intensity approach lights may also have hindered the crew's ability to properly position the aircraft for landing.

2.5 Flare and Landing

The captain took control of the aircraft at DH when it was below the glide path and left of the extended centre line of the runway. Because of the rain and fog, the captain had limited visual cues as he attempted to correct to the centre line. At the flare, as the fog thickened and visibility decreased, the captain elected to complete the landing using the radio altimeter for altitude reference. At that point, the captain was deprived of most visual cues and could not adequately see the runway environment. By the time he regained sight of the runway, the aircraft had tracked to the left, as a result of the aircraft heading at touchdown, the wet runway surface and, to some degree, the effect of the cross-wind. The captain was then able to steer the aircraft back to the centre of the runway.

2.6 Snow Clearing

Given the configuration and attitude of the aircraft, it is probable that if snow clearing had been to Transport Canada guidelines, the strike would not have occurred.

2.7 Decision to Land

As the aircraft passed DH, the captain could see the runway environment and decided that he could land safely. When he lost visual references in the flare, the aircraft was in a position where, in accordance with Aeroflot practice, a go-around should not be attempted.

3.0 CONCLUSIONS

3.1 Findings

1. The landing was completed under the influence of a right cross-wind and slight tail wind, in weather conditions which restricted visual landing references.

2. Two-thirds of the high-intensity approach lights for runway 04 were unserviceable; the relevant NOTAM stated that one-third of the lights were unserviceable.

3. The approach was not stabilized when the captain took control at decision height.

4. As the captain was attempting to correct to the centre line, the aircraft entered an area of more dense fog, and the captain lost adequate visual contact with the runway environment.

5. Because the aircraft was in the landing flare, the captain, in accordance with Aeroflot practice, considered himself committed to land.

6. During the landing, the aircraft touched down with the left wing low; under the influence of the cross-wind and wet runway, the aircraft moved to the left and ran along the left edge of the runway.

7. A four-foot-square section of the nacelle of the number one engine was torn off when the engine struck a snowbank parallel to the runway.

8. The snow depth where the engine struck the snow was up to 4.5 feet. The snow depth, according to Transport Canada guidelines, should not have exceeded 2.5 feet; however, Priority III area snow removal had not been completed because of the heavy snow accumulation in the days prior to the incident.

9. The aircraft crew was not aware that Priority III area snow removal had not been completed to Transport Canada guidelines.

10. The flight crew was certified and qualified for the flight.

11. The aircraft weight and centre of gravity were within the prescribed limits.

12. There was no evidence found of any airframe or system malfunction prior to or during the flight.

3.2 Causes

While attempting to land from an unstabilized approach, the pilot brought the aircraft below the altitude prescribed by the standards of the USSR Civil Aviation Ministry for the performance of the missed approach manoeuvre. The pilot was unable to maintain the aircraft on the runway centre line because of the lack of adequate visual references when dense fog was encountered during the landing flare. Contact with a snowbank that was parallel to the runway and that was higher than specified by Transport Canada guidelines contributed to the aircraft damage.

4.0 SAFETY ACTION

4.1 The Canadian Aviation Safety Board (CASB) notes the following action taken by USSR Civil Aviation Authorities as a consequence of this occurrence:

a. The circumstances and causes of this occurrence have been the subject of a promotional campaign to both flight and air traffic control personnel;

b. Steps have been taken to exclude the possibility of aircrew "ducking under" the prescribed glide path while conducting an approach in adverse weather conditions; and

c. Flight crews are now permitted to initiate a go-around, if required, from any flight altitude during the final stages of the approach.

4.1.2 Snow-Removal Guidelines

The CASB forwarded an Aviation Safety Advisory to the Department of Transport, addressing the snow-removal guidelines for airports across Canada. The CASB suggested that Transport Canada review the current snow-clearing guidelines for relevancy, ease of understanding, and consistency of application. Transport Canada has indicated that:

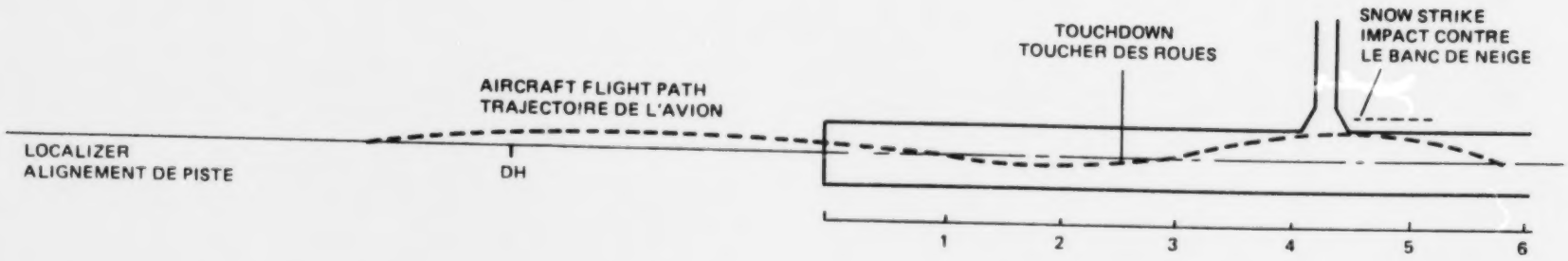
a. A review of the current snow-clearing practices will be conducted by officials of the Airport Authority Group; and

b. Transport Canada will ensure that there is no misunderstanding on the part of airport supervisors in regard to the snow-removal guidelines.

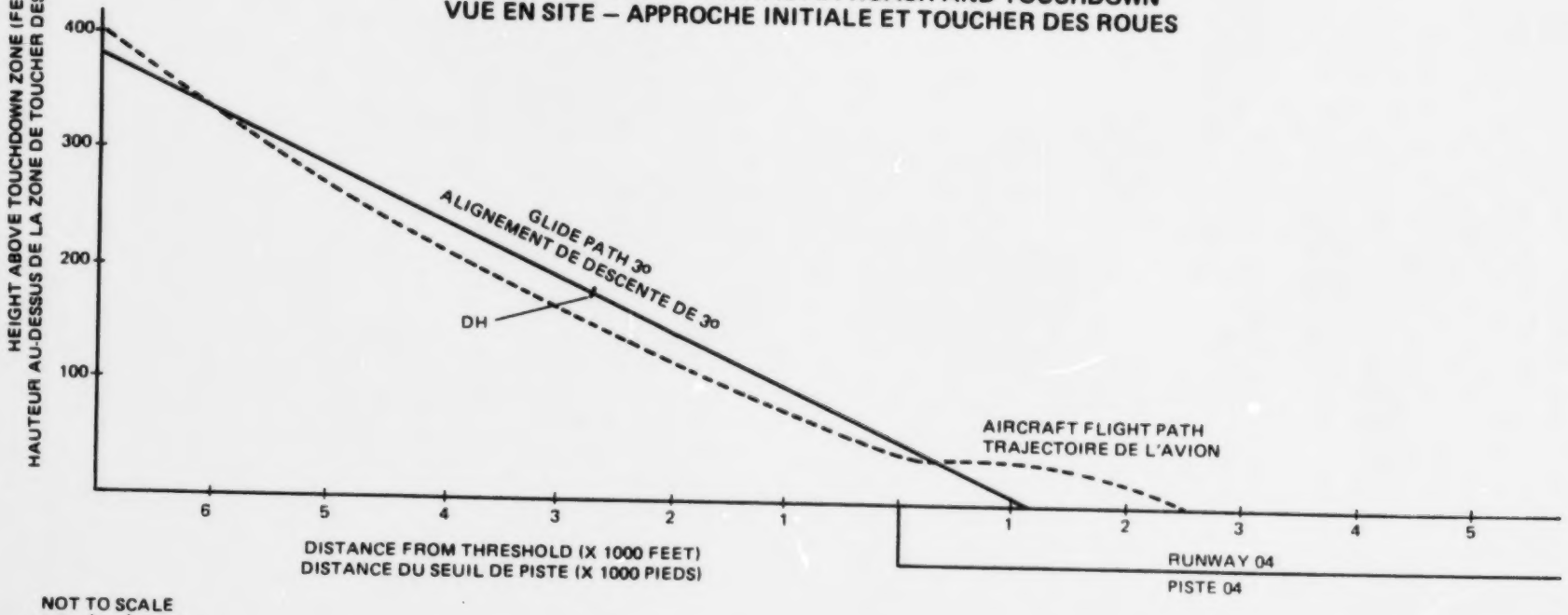
This report and the safety action therein has been adopted by the Chairman, K.J. Thorneycroft, and Board Members:

N. Bobbitt
L. Filotas
W. MacEachern
D. Mussallem
A. Portelance
R. Stevenson
F. Thurston

PLAN VIEW – INITIAL APPROACH AND LANDING ROLL
VUE EN PLAN – APPROCHE INITIALE ET COURSE À L'ATTERRISSAGE



ELEVATION VIEW – INITIAL APPROACH AND TOUCHDOWN
VUE EN SITE – APPROCHE INITIALE ET TOUCHER DES ROUES



NOT TO SCALE
NON À L'ÉCHELLE

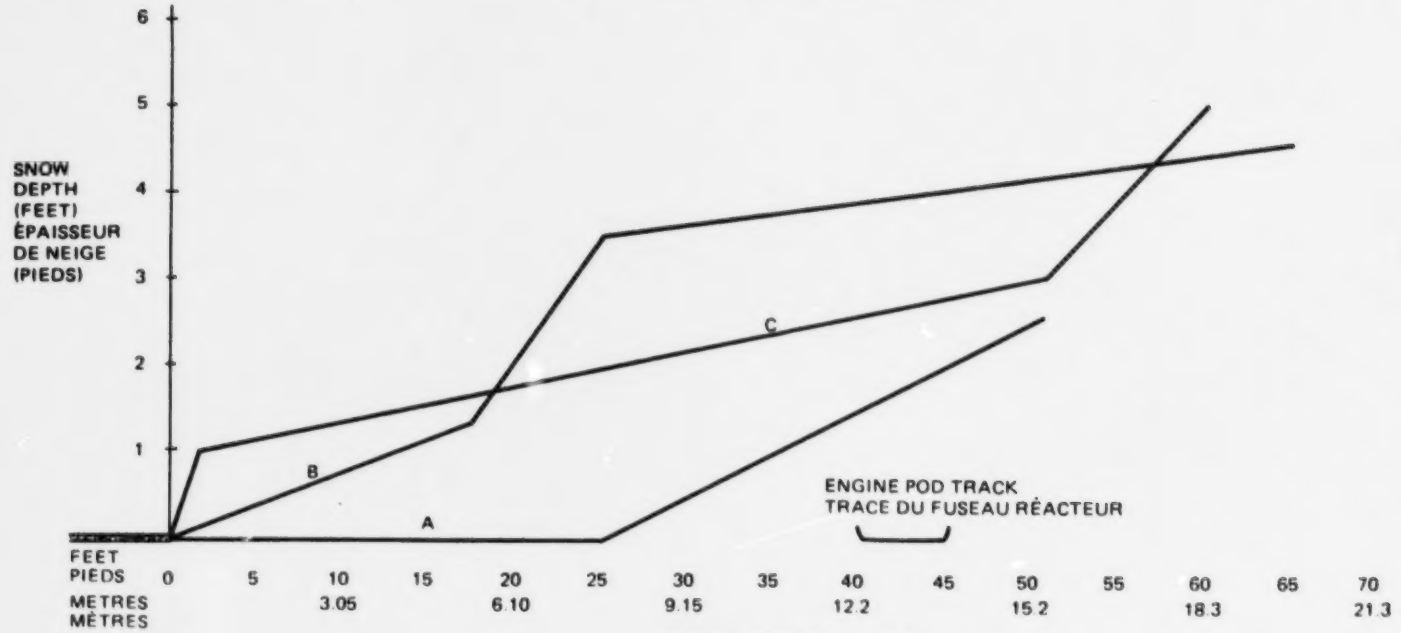
APPENDIX A
TO 87-A74916
ANNEXE A
A 87-A74916

SNOW PROFILE
DÉNEIGEMENT

A – TRANSPORT CANADA GUIDELINE
LIGNES DIRECTRICES DE TRANSPORTS CANADA

B – ACTUAL SNOW DEPTH (POINT OF MAXIMUM DEPARTURE)
ÉPAISSEUR RÉELLE DE LA NEIGE (POINT LE PLUS ÉLOIGNÉ SUR LA PISTE)

C – ICAO GUIDELINE
PRATIQUES RECOMMANDÉES DE L'OACI



APPENDIX B
TO 87-A74916
ANNEXE B
A 87-A74916

APPENDIX C

GLOSSARY

agl	above ground level
asl	above sea level
CASB	Canadian Aviation Safety Board
CVR	cockpit voice recorder
DH	decision height
FDR	flight data recorder
hr	hour(s)
IFR	instrument flight rules
IL	Ilyushin
ILS	instrument landing system
IMC	instrument meteorological conditions
kg	kilogram(s)
lat	latitude
long	longitude
MHz	megahertz
N	north
NOTAM	Notice to Airmen
RVR	runway visual range
UTC	Coordinated Universal Time
W	west
°	degree(s)
'	minute(s)